



## Parasites of Western Australia

### XV

# A New Species of *Psorergatoides* (Acarina: Psorergatidae) from Australian Bats

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and A. Fain†

#### Abstract

*Psorergatoides australiensis* sp. nov., parasitic on *Eptesicus pumilus*, is described, figured and compared with related species. Specimens from *Eptesicus douglasi*, *Nyctophilus arnhemensis* and *Nyctophilus walkeri* cannot be separated from those from the type host.

#### Introduction

Species of *Psorergatoides* Fain, 1959b live as minute, disc-shaped parasites beneath the stratum corneum of the wings or ears of bats. The genus has not previously been reported from Australia.

During the joint expedition of the Western Australian Museum (WAM) and the Field Museum of Natural History, Chicago (FMNH) to Mitchell Plateau, in the Kimberley Division of Western Australia in 1976-1977, F.S.L. collected a new species of *Psorergatoides* from four species of vespertilionid bats. This species shares four characters (two setae on femora I-III, a bifid spine and one-pointed claws on tarsi, no terminal body setae in males) with *P. kerivoulae* Fain, 1959a, *P. nycteris* Fain, 1959a, and a species to be described later (Giesen *et al.* in press; referred to subsequently as *P.* species A). The new species is compared with these three.

Measurements are tabulated in micrometers ( $\mu\text{m}$ ).

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Systematics

*Psorergatoides australiensis* sp. nov.

Figures 1-9

Holotype

WAM 81-570; female; from *Eptesicus pumilus* (Gray, 1841); Geikie Gorge, Western Australia, 18°05'S, 125°43'E; 8 October 1976. Host in FMNH, no. 120153.

Allotype

WAM 81-571; male; host, locality and date as for holotype.

Paratypes

WAM 81-572, 81-643 (eight specimens); from *Eptesicus pumilus* (Gray, 1841); near Aluminium Camp, Mitchell Plateau, 14°50'S, 125°49'E; 23 October 1976. Host in WAM, field no. 3076; WAM M15756. Other paratypes are in FMNH; U.S. National Museum of Natural History (Smithsonian Institution), Washington; Acarology Laboratory, Ohio State University, Columbus; Rocky Mountain Laboratory, Hamilton; Rijksmuseum van Natuurlijke Historie, Leiden; Zoologisches Institut und Zoologisches Museum, Hamburg; British Museum (Natural History), London; and in collection of authors.

Diagnosis

Species with paired femoral setae IV, female with very long terminal body setae (78-108  $\mu\text{m}$ ), male without terminal body setae. Largest adult, a female, 167 x 152  $\mu\text{m}$ .

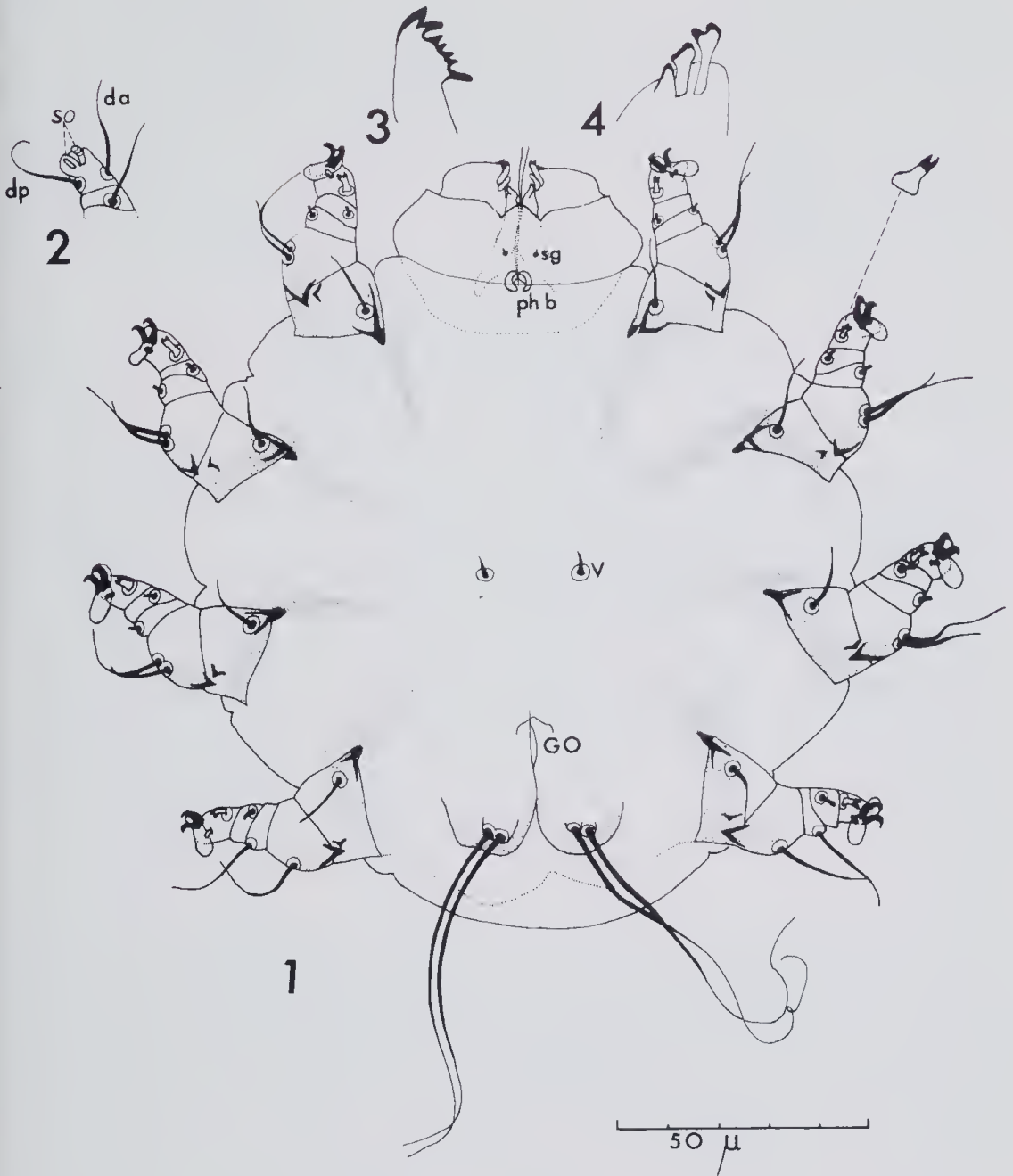
Description

*Female* (Figures 1-7)

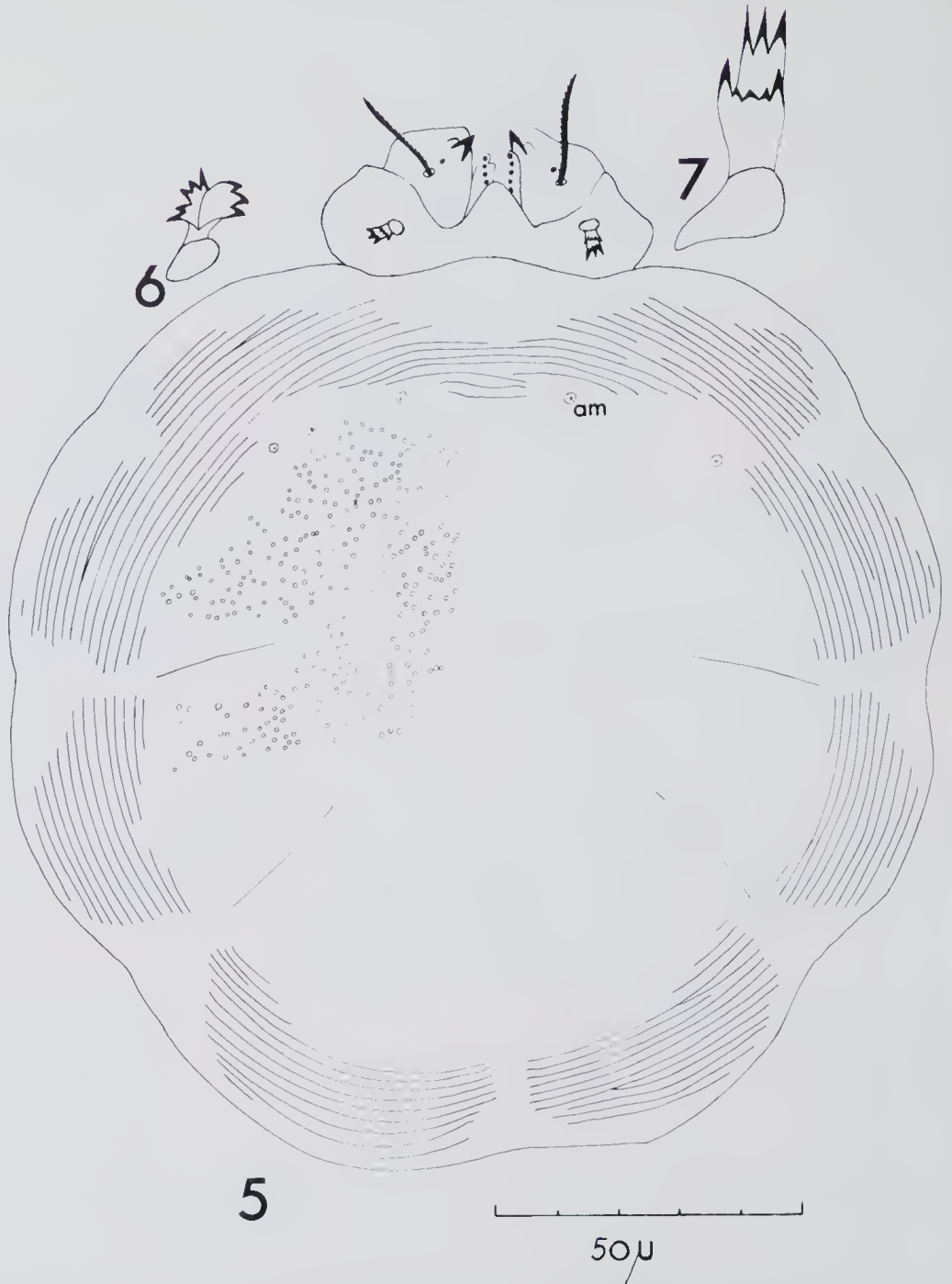
Whitish, medium-sized mites with a total length (including gnathosoma) in the holotype of 159  $\mu\text{m}$ , width 142  $\mu\text{m}$ . Venter (Figure 1): All epimera straight, directed towards centre. Genital opening (*GO*) between adanal lobes, each of which carries a pair of long terminal setae. Ventral setae (*V*) just anterior to epimera III. Cuticle smooth.

Legs subequal, short and stout, with five free segments, evenly spaced ventrolaterally. Tarsi with two equal one-tined claws, bilobed empodium with smaller lobes between claws, sclerotized condylophores inside tarsus, bifid ventroanterior spur, and two subequal dorsal setae (Figure 2, *da*, *dp*). Two solenidia (*so*) on tarsi I-II. Seta *dp* lacking on tarsus IV. Tibiae with ventroanterior blunt spine and relatively long dorsal seta. Genua I-III with short posterolateral seta, genu IV with long seta (longer than femoral seta). Femora with strongly sclerotized posterior spur forming pincers with small spur on trochanters, a pair of unequal posterolateral setae on I-III, and a single seta on IV. Trochanters with a strongly sclerotized ventroanterior spur protruding to act as an anchor in skin of host, a relatively strong seta at base of this spur, and a small posterior spur.

Gnathosoma with two short subgnathosomal setae (*sg*) in front of pharyngeal bulb (*ph b*), two-segmented palps, and chelicerae with seven-dentate fixed



Figures 1-4 *Psorergatoides australiensis* sp. nov. (female): (1) venter of holotype; (2) dorsal view of tibia-tarsus I of holotype; (3) chelicera of squashed paratype; (4) palpal tarsus of squashed paratype.



Figures 5-7 *Psorergatoides australiensis* sp. nov. (female): (5) dorsum; (6-7) gnathosomal (supracoxal) seta enlarged.

digit (Figure 3) and stylet-like movable digit. Palpal tarsus with two ventro-medially directed modified setae and a one-tined spine (Figure 4). Palpal tibia dorsally with a long servate posterior seta, a minute anterior seta, and a terminal anteriorly directed spur. Gnathosomal (supra-coxal) setae (Figures 6, 7) two-lobed, with dentate edges.

Dorsum (Figure 5). Dorsal shield almost round, weakly sclerotized, and distinctly punctate except for periphery and two pairs of sector-like furrows laterally at level of legs III-IV. Anteromedian pair of setae on shield (*am*) and four pairs of lateral setae indistinct in most paratypes (second to fourth pair absent in Figure 5). Soft parts of dorsum striate as figured.

Measurements in Table 1.

Table 1 Measurements of females of *Psorergatoides australiensis* from four host species.

Host species	<i>Eptesicus pumilus</i>			<i>Eptesicus douglasi</i>		<i>Nyctophilus arnhemensis</i>		<i>Nyctophilus walkeri</i>	
	Holo-type	X	min-max (n = 10)	$\bar{X}$	min-max (n = 10)	$\bar{X}$	min-max (n = 10)	$\bar{X}$	min-max (n = 8)
body length	159	162	(159-167)	169	(154-176)	174	(168-184)	177	(161-188)
width	142	145	(140-152)	148	(139-155)	153	(149-157)	153	(142-159)
shield length	105	108	(105-112)	114	(107-120)	115	(110-120)	117	(113-130)
width	102	105	(100-110)	109	(105-113)	118	(114-122)	118	(110-123)
setal length									
terminal	80	94	(78-108)	91	(73-115)	101	(85-115)	99	(75-109)
trochanter	16	13	(10-16)	11	(10-13)	16	(10-21)	12	(11-15)
femora I-III	23	23	(20-27)	23	(21-25)	25	(23-27)	26	(21-30)
femur IV	18	19	(14-25)	17	(14-21)	21	(18-26)	20	(18-23)
genua I-III	2	2	(2-3)	2	(2-3)	2	(2-3)	3	(2-3)
genu IV	20	22	(17-29)	22	(20-30)	27	(21-30)	24	(19-28)
ventral	5	6	(4-8)	7	(5-9)	10	(6-15)	8	(7-10)
distance between ventral setae	18	16	(14-20)	20	(15-24)	17	(14-21)	14	(11-16)
length post. palpal tibial setae	17	17	(15-18)	16	(12-19)	20	(18-22)	23	(19-24)
length gnathosomal setae	7	7	(6-8)	7	(6-8)	8	(8-9)	8	(6-9)

### Male (Figure 8)

Similar to female in the main. Venter with short sclerotized median lobe, without terminal setae.

Dorsal shield distinctly longer than broad, with a median longitudinal furrow, but without lateral furrows in areas at level of legs III-IV. Genital slit between anteromedian setae (*am*). Penis short, with cone-shaped sheath. Genital setae (*gs*) closer to midline than *am* setae. Lateral shield setae distinctly inserted to sides of pits.

Measurements in Table 2.

### Developmental Stages

With gnathosoma of almost adult size; indistinguishable from those of *P. glossophagae* Lukoschus *et al.*, 1973 and *P. desmodus* Lukoschus *et al.*, 1979. Deutonymph 137  $\mu\text{m}$  long x 123  $\mu\text{m}$  wide; protonymph 108  $\mu\text{m}$  x 97  $\mu\text{m}$ ; larva 105  $\mu\text{m}$

x 91  $\mu\text{m}$ ; egg 98  $\mu\text{m}$  x 93  $\mu\text{m}$ , almost spherical, relatively large in relation to female.

Table 2 Measurements of males of *Psorergatoides australiensis* from four host species.

Host species	<i>Eptesicus pumilus</i>			<i>Eptesicus douglasi</i>		<i>Nyctophilus arnhemensis</i>		<i>Nyctophilus walkeri</i>
	Allo-type	X	min-max (n = 4)	X	min-max (n = 9)	X	min-max (n = 10)	min-max (n = 2)
body length	159	155	(146-159)	150	(135-166)	169	(159-179)	117-129
width	122	122	(115-129)	120	(108-130)	133	(125-140)	105-110
shield length	102	98	(90-102)	103	(88-120)	111	(105-120)	76-77
width	98	91	(84-98)	87	(77-101)	96	(88-115)	85-86
setal length								
trochanter	11	12	(11-12)	11	(10-13)	13	(11-17)	7
femora I-III	17	18	(17-19)	17	(14-23)	21	(18-26)	—
femur IV	13	14	(13-16)	14	(12-16)	16	(11-20)	—
genua I-III	2	2		2		2		—
genu IV	18	17	(16-18)	14	(10-17)	19	(15-25)	—
ventral	6	5	(5-6)	6	(5-8)	8	(5-11)	4-11
distance between ventral setae	19	19	(16-21)	20	(13-30)	22	(19-26)	23-25
length post. palpal tibial setae	12	13	(12-14)	14	(10-17)	18	(16-18)	15-16
length gnathosomal setae	4	4		6	(5-7)	8	(6-9)	5-6
length penis	19	18	(15-22)	25	(21-30)	26	(23-32)	26-31
length penis sheath	16	16		17	(15-19)	18	(17-19)	16-17
distance between <i>a m</i> setae	12	12	(11-12)	12	(10-13)	12	(11-14)	19
distance between genital setae	9	9	(8-9)	9	(8-10)	9	(7-10)	11-13

### Pathogenicity

The mites were found in the dactylopatagium between digits 3-4 on the dorsal side, living between the stratum granulosum and the stratum corneum and feeding on the cells of the stratum granulosum, causing hyperkeratosis. In infested regions, the stratum corneum is not melanized, and appears white to the naked eye. Both host specimens were only slightly infested, and only low-grade pathology was observed.

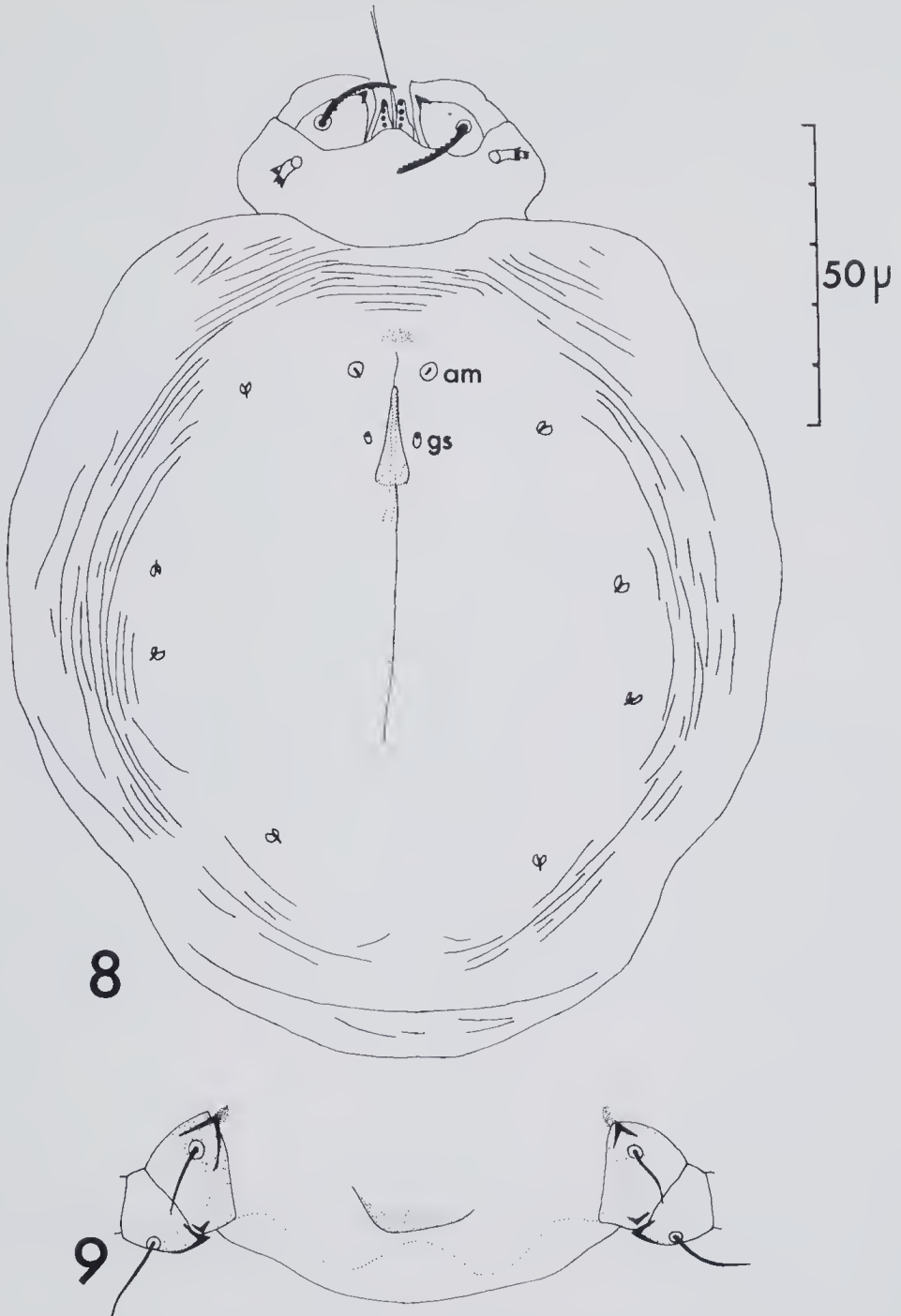
### Comparison with Related Species

Of the six known species of *Psorergatoides*, four possess paired femoral setae on leg I-III: *P. kerivoulae*, *P. nycteris*, *P. species A* and *P. australiensis*. *P. kerivoulae* differs from *P. australiensis* in its longer trochanteral setae, subequal femoral setae, shorter genu IV, and shorter gnathosomal setae; *P. nycteris* in its very short femoral, genual, and terminal setae; and *P. species A* in its very small body size, short terminal setae, and gnathosomal setal shape.

For comparison, we add measurements of females and males of these species in Tables 3-4 (male of *P. nycteris* unknown).

### Other Material Examined

Additional specimens of *P. australiensis* were collected from the following vespertilionid hosts: *Eptesicus douglasi* Kitchener, 1976, Geikie Gorge, 4 and 8 October 1976; fourteen specimens (WAM 81-579 to 81-584, 81-644), (hosts FMNH 120092, 120110). *Nyctophilus*



Figures 8-9 *Psorergatoides australiensis* sp. nov. (male): (8) dorsum; (9) venter; caudal part.

Table 3 Measurements of females for comparison with related *Psorergatoides* species.

Species	<i>Psorergatoides australiensis</i>		<i>Psorergatoides kerivoulae</i>		<i>Psorergatoides nycteris</i>		<i>Psorergatoides</i> species A	
	X	min-max	X	min-max	X	min-max	X	min-max
body length	162	(159-167)	178	(170-186)	188	(175-205)	111	(102-117)
width	145	(140-152)	156	(148-162)	169	(169-180)	98	(96-105)
shield length	108	(105-112)	130		135		78	(75-81)
width	105	(100-110)	126		130		74	(70-79)
setal length								
terminal	94	(78-108)		(75-80)		(8-10)	47	(45-50)
trochanter	13	(10-16)		(12-18)		(4-6)	6	(5-8)
femora I-III	23	(20-27)		(15-20)	6	(4-6)	15	(13-18)
femur IV	19	(14-25)		(12-15)		(4-5)	11	(10-13)
genua I-III	2	(2-3)		(1-2)		(1-2)	1	(1-2)
genu IV	22	(17-29)		(15-18)		(1-2)	20	(19-23)
ventral	6	(4-8)		(6-7)	3		4	(4-5)
distance between ventral setae	16	(14-20)	16	(16-18)	12		16	(16-18)
length post. palpal tibial setae	17	(15-18)	15	(13-17)		(8-10)	6	(5-8)
length gnathosomal setae	7	(6-8)		(3-4)	4	(2-4)	5	(4-6)

Table 4 Measurements of males for comparison with related *Psorergatoides* species.

Species	<i>Psorergatoides australiensis</i>		<i>Psorergatoides kerivoulae</i>		<i>Psorergatoides</i> species A	
	X	min-max	X	min-max	X	min-max
body length	155	(146-159)		(185-186)	98	(93-105)
width	122	(115-129)		(145-147)	82	(75-90)
shield length	98	(90-102)	120		71	(69-74)
width	91	(84-98)	90		62	(59-65)
setal length						
trochanter	12	(11-12)			5	(5-6)
femora I-III	18	(17-19)		(12-15)	10	(9-11)
femur IV	14	(13-16)			8	(8-9)
genua I-III	2			(1-2)	1	
genu IV	17	(16-18)		(8-9)	15	(13-16)
ventral	5	(5-6)			4	
distance between ventral setae	19	(16-21)	18		21	(19-26)
length post. palpal tibial setae	13	(12-14)	13		7	(6-8)
length gnathosomal setae	4		4		5	(4-8)
length penis	18	(15-22)	52		28	(25-29)
length penis sheath	16		22		12	(11-23)
distance between <i>u m</i> setae	12	(11-12)		(4-5)	10	(9-11)
distance between genital setae	9	(8-9)		(4-5)	6	

*arnhemensis* Johnson, 1959, Beverley Springs Station, 18°35'S, 125°29'E, 19 and 20 September 1976: eight specimens (WAM 81-573 to 81-578, 81-642); (hosts FMNH 120681, 120686). *Nyctophilus walkeri* Thomas, 1892, Camp Creek near Aluminium Camp on Mitchell Plateau, 18 October 1976 (host WAM M15768).

### Remarks

The *Psorergatoides* collected from the other host species do not show distinct morphological differences from those from *Eptesicus pumilus*, although there are some meristic differences.



Measurements of the main characteristics are given in Tables 1-2. We believe *Psorergatoides* spp. are each specific to one host species, and it may be that the non-overlapping measurements in some characteristics (e.g. length of body, dorsal shield, and penis) indicate a very close species relationship. However, because of the lack of distinct morphological characteristics, we prefer to assign these specimens to *P. australiensis*.

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